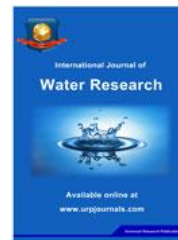




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Original Article

A COMPARATIVE STUDY OF FLUORIDE AND OTHER WATER QUALITY PARAMETERS OF BOREWELL WATER OF NALGONDA TOWN OF TELANGANA, INDIA

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Abstract

In the present study, fluoride levels were estimated in Nalgonda town of Telangana, India. Levels of fluoride and other parameters like chlorine, residual chlorine, nitrate, nitrites, ammonium, Total dissolved salts and total hardness was also measured. Highest levels of fluoride were seen in Sriramnagar borewell water sample followed by Ramakrishnanagar water samples. Total dissolved solids were found to be high in Srinagar colony bore water. Chloride levels were higher in Ramakrishnanagar colony. Levels of nitrate were high in Sheshammagudem water samples. Total hardness recorded was high in Sheshammagudem and Sriramnagar colony. Significance of the above results is discussed in the light of existing literature.

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Key words Fluoride, Nalgonda, TDS, nitrates, chlorides.

INTRODUCTION

Water is an essential natural resource for sustaining life and environment. Groundwater contributes of only about 0.6% of total water resources and is the major available source of drinking water. Presence of Fluoride has been known to be found as a contaminant and toxin in groundwater. Excess fluoride in drinking water has been known to cause fluorosis. The geological characteristics and chemical properties of rocks and climate of the region are responsible for the presence of fluoride in the water. Water contamination takes place through several sources one of which is fluoride. Fluoride in small quantities are present in bone, teeth and seawater but ground water contamination is due to fluoride associated with NaF and KF, CaF₂ and PbF₂. Fluoride is an accumulative toxin and fluorosis results from an intake of more than 6 ppm for litre of water. Fluorinated water consumption makes the bones more brittle. International Society for Fluoride Research (ISFR) has implicated fluoride in the rising rates of chronic fatigue syndrome, sleep disorders and Down's syndrome. Fluoride primarily effects on skeletal tissues [1]. Skeletal fluorosis is observed when drinking water contains 3-6 mg/L whereas crippling skeletal fluorosis is observed when the intake exceeds 10 mg/L of fluoride [2]. Fluoride affected states in India include Andhra Pradesh [3]

Tamilnadu, [4] Rajasthan[5] and Madhyapradesh [6]. Defluoridation process may be classified broadly into two namely Additive methods and Adsorptive methods. Some other techniques are reverse osmosis, steam of phytomass, activated cotton jute carbon, adsorption using sunflower plant dry powder, Nalgonda technique, and activated alumina process. Various defluoridation techniques [7-14] for removal of fluoride have been reported. In continuation of earlier studies on fluoride [15-20], the present study has been carried out to estimate the levels of fluoride and other water quality parameters in Nalgonda town where fluoride has been reported to be high. Hence, the present investigation was done and the results are discussed.

MATERIAL AND METHODS

Water samples have been collected from bore water in the Nalgonda town which is the headquarters of the Nalgonda District of Telangana, India. The collecting bottles were thoroughly cleaned by rinsing with 8M HNO₃ solution and then washing with double distilled water. The fluoride content and other parameters were determined using a commercially available fluoride and other parameters testing kits (NICE).

RESULTS AND DISCUSSION

The different methods for the removal of excess fluoride from water are Adsorption methods, ion exchange

Table 1: Fluoride and other parameters estimated in Nalgonda

Sample and Place	Flouride (ppm)	Chloride	Residual Chlorine	Nitrate	Nitrite	Ammonium	TDS (ppm)	Total hardness (ppm)
S1	-	220	-	25	-	-	650	500
S2	2.5	300	-	5.0	-	-	200	120
S3	1.5	260	-	5.0	-	-	480	500
S4	1.0	130	1.0	2.0	-	-	250	90
S5	-	200	-	5.5	-	-	600	500
S6	-	-	-	5	-	-	300	70
S7	1.5	300	-	5.0	-	-	350	100
S8	3.5	300	-	5	-	-	600	680
S9	2.8	700	-	-	-	0.5	300	650
S10	1.5	-	-	10	-	2.0	472	750

S1-Srinagar Colony, S2 –Bhasker Oil mill, S3- Shivajinagar I, S4- Shivajinagar II, S5- E.Seva Shivajinagar, S6-Headquarters, S7- Ramgiri, S8- Sriramnagar, S9- Ramakrishnanagar, S10-Sheshammagudem

methods, precipitation methods and other miscellaneous methods. Total dissolved salts and total hardness was also measured. Highest levels of fluoride were seen in Sriramnagar borewell (3.5 ppm) water sample followed by Ramakrishnanagar water samples (2.8ppm) (Table 1). Total dissolved solids were found to be high in Srinagar colony bore water. Chloride levels were higher in Ramakrishnanagar colony. Levels of nitrate were high in Sheshammagudem water samples. Total hardness recorded was high in Sheshammagudem and Sriramnagar colony. Srinagar colony, E-seva Shivajinagar and headquarters did not show the presence of fluoride. Nitrite was totally absent in all the samples tested. Ammonium was found only in two samples of Ramakrishnanagar and Sheshammagudem. Residual chlorine was detected only in Shivajinagar II sample and was absent in other samples.

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